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Competing in the '90s

The Information Edge

Magic Paper Technical Summary

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Magic Paper

Technical Summary

Computer applications are undergoing a major evolution—from standalone programs that address the productivity of an *individual* to applications that promote cooperation, communication and synergism among *groups* of individuals. Called "groupware" or Computer Supported Cooperative Work (CSCW), this new breed of application promises to become the next major driver of the computer revolution. Indeed, many applications in use today are being modified and extended to serve the needs of networked groups.

Multimedia Groupware

Magic Paper™ is an experimental computing system designed to support groupware applications. It was developed by researchers at the IBM Watson Research Center in cooperation with the Application Solutions Division. As its name suggests, it provides users with an electronic "material" in which just about any kind of information can be contained and shared over a network with others. In its initial version, Magic Paper represents a powerful, general communications medium that can create and access a variety of information media from multiple sources and share these objects dynamically among users over a local or wide area network.

The exchange of information is the essence of any organization. Magic Paper can handle just about any type of digital media—whether text, data, hypertext, image, graphics, audio or full-motion video. Thus, the letters, newspapers, textbooks, business forms, file folders, libraries, bulletin boards, stock quotes, flip charts, calendars and buck slips that are the lifeblood of today's organization can be incorporated in sheets of Magic Paper and shared with colleagues around the world.

New Forms of Information

And with the advent of fiber-optic local and wide area networks and video compression technology, the accessing and transmission of full-motion video will be as easy as sending an e-mail message is today. IBM recently announced support for FDDI, Fiber Distributed Data Interface—and our ActionMedia™ 750 Delivery and Capture Adapters represent the state of the art in DVI™ technology. In the future, users will have transparent access to extensive shared libraries of multimedia objects—stored locally, or on multi-gigabyte arrays of optical disks located somewhere on the network.

A New Paradigm for Information Exchange

But Magic Paper offers more than the ability to transmit new types of information. It also incorporates the new groupware paradigm for *sharing* information across a network. With Magic Paper, anyone in the group can launch a computer-based "discussion"

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that others can contribute to and review at will. Users don't have to know who is in the group, where they are located, or how to get the information to them: Magic Paper does it all.

The groupware concept is very different from today's electronic mail, where the sender consults a directory or distribution list and must decide on a case-by-case basis who will see what information. In the groupware approach, members of the network with similar responsibilities and interests, whether inside or outside the organization, acquire the information they need at the level appropriate to their authorization—from "priority action" to "information only." Issues are floated electronically throughout the group—tapping the best ideas available in what might be called a multimedia, computer-based version of a Town Meeting. And to curb information overload, artificial intelligence algorithms and knowledge-based systems can be called on to evaluate and filter the flow of information according to rules established by the participants.

The Magic Paper Demonstration

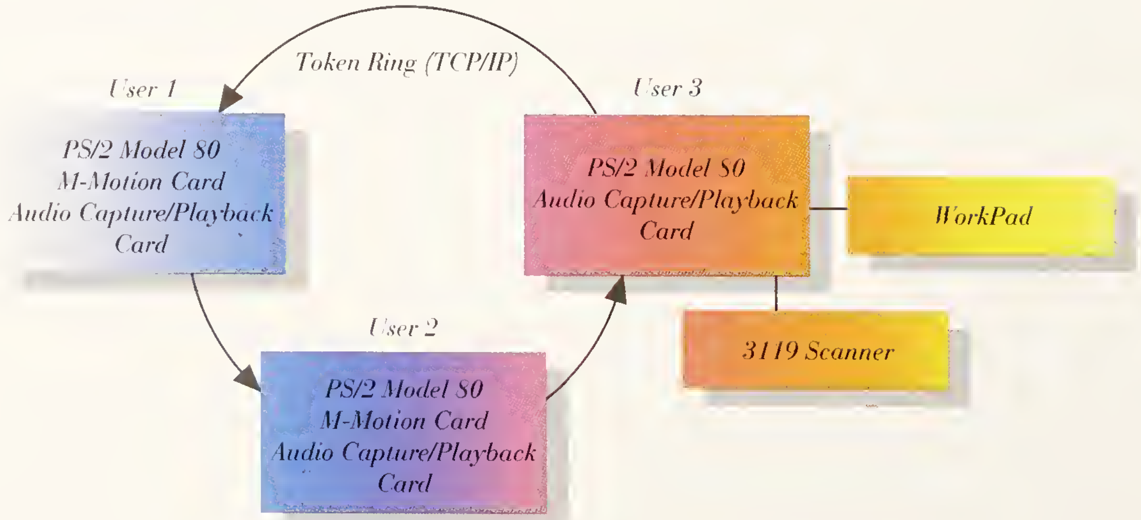
To achieve its multiple goals, Magic Paper is designed as a distributed application environment that can operate effectively across large, heterogeneous, distributed networks of computers.

A functioning Magic Paper environment was set up to demonstrate a number of its capabilities. These included:

- multiple windows, tasks and hyperlinks running under the OS/2® Presentation Manager™;
- the easy creation of complex, multimedia documents;
- hypertext links across all elements of the environment; and,
- the sharing of information in group discussions.

The network hardware consisted of IBM Token-Ring Network™ 16/4 Adapter/A cards running TCP/IP (*see diagram below*). Each of the users had a PS/2® Model 80 workstation equipped with 16 megabytes of RAM. The PS/2 workstations were fitted with various multimedia hardware, including speakers, the IBM M-Motion Video Adapter/A™ card, an Audio Capture Playback Adapter card and an experimental handwriting tablet WorkPad™.

An IBM 3119 Scanner was available to convert paper documents to digital form. Then, utilizing the Paper-Like Interface™ and the Advanced User Interface™ of the WorkPad, additional information was handwritten into the Magic Paper document. The WorkPad is an experimental tablet developed by



the Application Solutions Division that uses gesture and handwriting-recognition algorithms developed by IBM. The entire Magic Paper system was written in C and REXX languages using the OS/2 Presentation Manager interface.

Magic Paper Technical Plan

An adaptation of IBM's GroupTalk product (which is currently available), Magic Paper is a joint development project of the Application Software Institute at IBM Research and the Application Solutions Division. Although there are no firm product plans at this time, Magic Paper is designed to integrate with and extend the capabilities of IBM's OfficeVision™ environment, in addition to working in non-OfficeVision environments.

The basic components of the Magic Paper system are:

- user interface programs;
- cooperating distributed servers;
- application *style programs;* and,
- communication *style programs.*

The user interfaces make possible the browsing (traversing, searching, displaying) and updating of Magic Paper documents. The application style programs are the parts of the system that process all commands (transactions) relating to the particular application—including invocation of common distribution functions provided by the servers, such as notifying users in their preferred styles of changes to the data.

The server is the part of the system that accepts commands, routes commands to appropriate application style programs and provides services to these applications. The server is designed to support future applications beyond today's Magic Paper capabilities. For example, a full-text search application style program may be a simple front end to an existing program such as STAIRS—but it appears as an integral part of the Magic Paper environment to the user. In addition, the server provides the communication style programs that support the variety needed in today's heterogeneous, multi-computer networks.

Future Development

The Magic Paper capabilities demonstrated to date represent merely the initial implementation of this flexible computing environment. Applications that could tap the strengths of Magic Paper in the future include business process aids such as electronic forms, dynamically-updated reference manuals, task management and group editing—as well as software distribution and the creation and distribution of softcopy documentation.

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